

**NEWMARKET -
E. GWILLIMBURY**

**water pollution
control plant**

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OCT 27 1969

ONTARIO WATER
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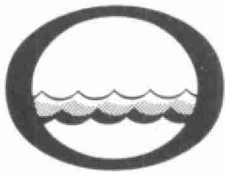
Division of Plant Operations

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Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

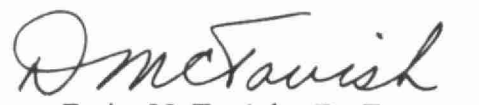
Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.



D. S. Caverly,
General Manager.



D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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NEWMARKET-EAST GWILLIMBURY
water pollution control plant

operated for

THE TOWN OF NEWMARKET

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

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'68 REVIEW

The total operating cost for 1968 was \$46,889.60 compared to the 1967 cost of \$39,215.29. The difference was mainly due to the 1967 tax bill of \$2,533.49 being paid in 1968, and to increases in payroll and repairs and maintenance items.

A total of 531.39 million gallons of raw sewage was treated in 1968, a decrease of 12 percent from the total of 606.46 million gallons treated in 1967. The average daily flow was 1.45 mgd, or 72.5 percent of the design dry weather flow of 2.0 mgd.

The raw sewage had an average concentration of 194 mg/l BOD and 253 mg/l suspended solids. The average BOD and suspended solids reductions were 91 and 97 percent respectively resulting in a final effluent with average concentrations of 18 mg/l BOD and 8 mg/l suspended solids.

The final effluent was disinfected with 12,640 pounds of chlorine between May 15 and October 20. A total of 957,000 gallons of digested sludge was hauled by tank truck. A total of \$5,253.30 was paid for sludge haulage in 1968.

The OWRC Research Division carried out process studies at the plant during the year. The cost of the studies was not charged to the municipalities.

PROJECT COSTS

NEWMARKET - STAGE II (WPCP)

NET CAPITAL COST (Final)		\$700,694.82
DEDUCT - Payments from Municipalities	\$ 90,000.00	
- Portion Financed by CMHC-MDLB (Final)	<u>449,521.34</u>	<u>539,521.34</u>
Long Term Debt to OWRC		<u>\$161,173.48</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968		\$ <u>17,788.21</u>
Net Operating		\$ 32,822.72
Debt Retirement		3,252.00
Reserve		4,983.26
Interest Charged		<u>9,016.99</u>
TOTAL		\$ <u>50,074.97</u>

RESERVE ACCOUNT

Balance at January 1, 1968	\$ 16,586.61
Deposited by Municipality	4,983.26
Interest Earned	<u>1,093.86</u>
	\$ 22,663.73
Add Payment	<u>175.00</u>
Balance at December 31, 1968	\$ <u>22,838.73</u>

NEWMARKET - STAGES I and III

NET CAPITAL COST (Final)	\$100,259.96
DEDUCT - Portion Financed by CMHC (Final)	<u>63,826.81</u>
Long Term Debt to OWRC	\$ <u>36,433.15</u>
 Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968	 \$ <u>4,963.20</u>
 Net Operating	 \$ -
Debt Retirement	735.00
Reserve	533.35
Interest Charged	<u>2,047.70</u>
 TOTAL	 \$ <u>3,316.05</u>

RESERVE ACCOUNT

Balance at January 1, 1968	\$ 3,513.69
Deposited by Municipality	533.35
Interest Earned	219.85
	<hr/>
	\$ 4,266.89
 Less Expenditures	 <hr/>
Balance at December 31, 1968	\$ <u>4,266.89</u>

EAST GWILLIMBURY -- STAGE II

NET CAPITAL COST (Final)	\$284,099.63
DEDUCT - Payments from Municipalities	<u>284,099.63</u>
Long Term Debt to OWRC	\$ Nil
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968	\$ Nil
Net Operating	\$ 14,066.88
Debt Retirement	-
Reserve	2,136.12
Interest Charged	<u>-</u>
TOTAL	<u>\$ 16,203.00</u>

RESERVE ACCOUNT

Balance at January 1, 1968	\$ 7,109.25
Deposited by Municipality	2,136.12
Interest Earned	468.82
	<u>9,714.19</u>
Add Payment	<u>75.00</u>
Balance at December 31, 1968	\$ <u>9,789.19</u>

EAST GWILLIMBURY -- STAGES I and III

NET CAPITAL COST	\$23,980.94
DEDUCT - Payments from Municipalities	<u>23,980.94</u>
Long Term Debt to OWRC	\$ Nil
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968	\$ Nil
Net Operating	\$ -
Debt Retirement	-
Reserve	132.88
Interest Charged	<u>-</u>
TOTAL	\$ <u>132.88</u>

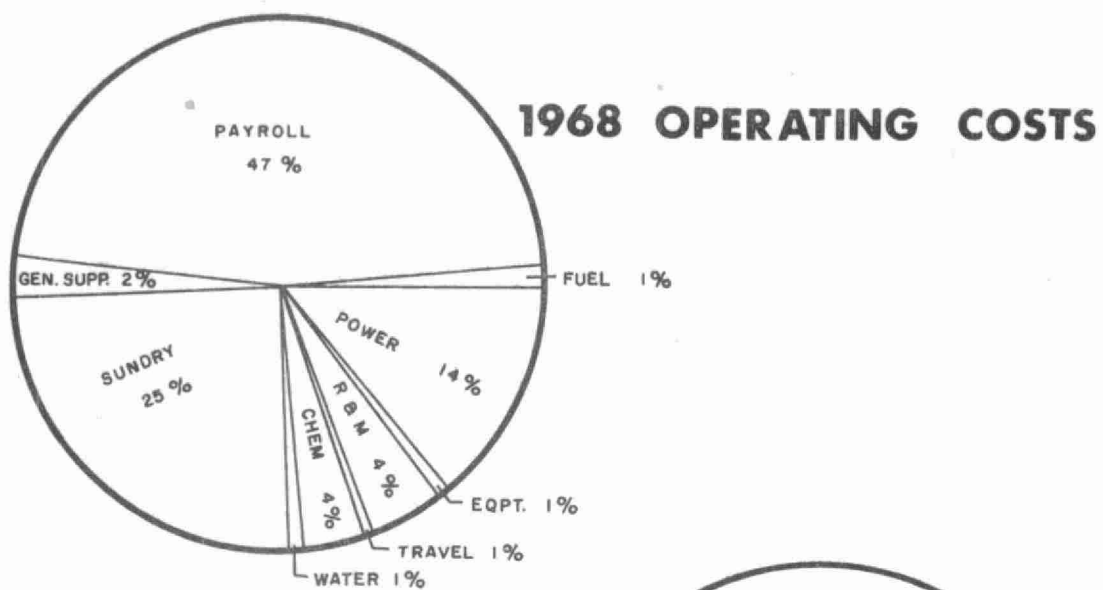
RESERVE ACCOUNT

Balance at January 1, 1968	\$ 873.13
Deposited by Municipality	132.88
Interest Earned	<u>54.62</u>
	\$ 1,060.63
Less Expenditures	<u>-</u>
Balance at December 31, 1968	\$ <u>1,060.63</u>

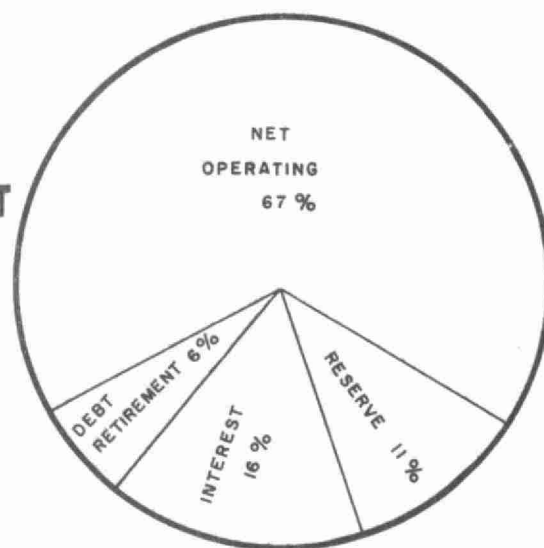
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAY ROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	1508.90	1421.94	-	-	-	-	31.46	-	-	41.36	-	14.14
FEB	2990.47	1319.33	-	119.20	679.87	-	83.76	-	213.43	524.40	32.00	18.48
MAR	6362.99	2371.62	-	119.20	601.16	-	39.38	-	43.32	3148.77	24.00	15.54
APRIL	3088.49	1348.65	-	119.20	736.30	46.20	65.33	25.00	365.32	329.77	32.00	20.72
MAY	2938.54	1392.63	56.59	-	715.78	-	122.13	-	142.79	477.50	16.00	15.12
JUNE	3108.83	1333.99	-	-	606.58	596.54	72.00	-	10.45	453.53	16.00	19.74
JULY	2540.50	1301.64	-	-	561.78	-	61.14	-	-	575.28	24.00	16.66
AUG	4375.45	2508.25	-	-	552.25	596.53	44.51	157.50	33.91	466.50	16.00	-
SEPT	3665.14	1707.22	-	-	550.54	596.54	54.49	-	244.67	482.70	-	28.98
OCT	3121.18	1723.49	-	-	523.93	-	48.45	68.80	216.02	466.04	48.00	26.45
NOV	6895.63	1676.48	-	112.65	526.68	-	187.70	-	262.24	4047.03	24.00	58.85
DEC	6293.48	4144.11	-	-	504.91	-	178.04	-	558.69	832.50	56.00	19.20
TOTAL	46889.60	22249.35	56.59	470.25	6559.81	1835.81	988.39	251.30	2090.84	11845.38	288.00	253.88

*SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$5,253.30.



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1965	476.23	\$32,566.48	\$68.38	4 cents
1966	547.45	38,546.14	70.41	4 cents
1967	606.46	39,215.29	64.16	4 cents
1968	531.39	46,889.60	88.24	5 cents

PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED 10 ³ lbs.	DOSAGE mg/l
JAN	41.55	1.34	1.42	1.11	0	-
FEB	52.19	1.80	7.77	1.13	0	-
MAR	61.18	1.97	3.14	1.04	0	-
APR	49.89	1.66	2.24	1.26	0	-
MAY	45.78	1.48	1.92	1.29	* 1.34	5.7
JUN	36.03	1.20	1.36	.99	2.21	6.1
JUL	33.48	1.08	1.27	.84	2.26	6.8
AUG	35.60	1.15	2.13	.84	2.46	6.9
SEPT	36.40	1.21	1.51	1.04	2.63	7.2
OCT	27.35	1.20	1.49	1.02	1.74	7.2
NOV	49.10	1.64	6.27	1.06	0	-
DEC	52.94	1.71	8.47	1.01	0	-
TOTAL	531.39	-	-	-	12.64	-
AVERAGE	-	1.45	-	-	2.53	6.6

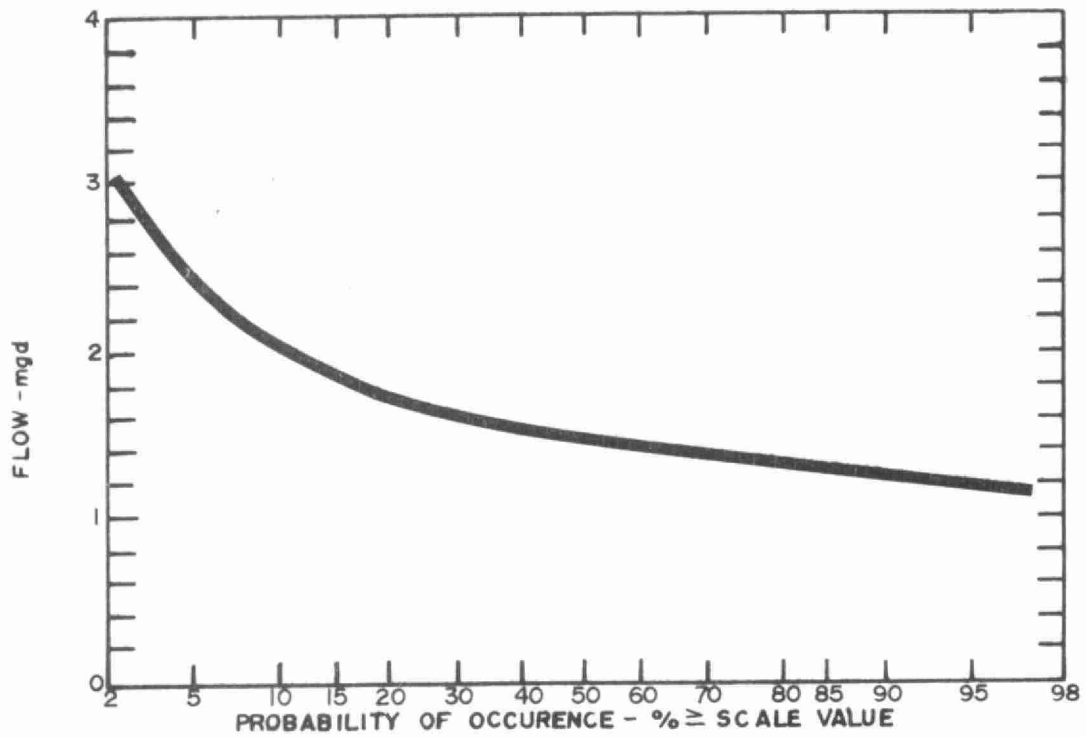
* Chlorination for 16 days

COMMENTS

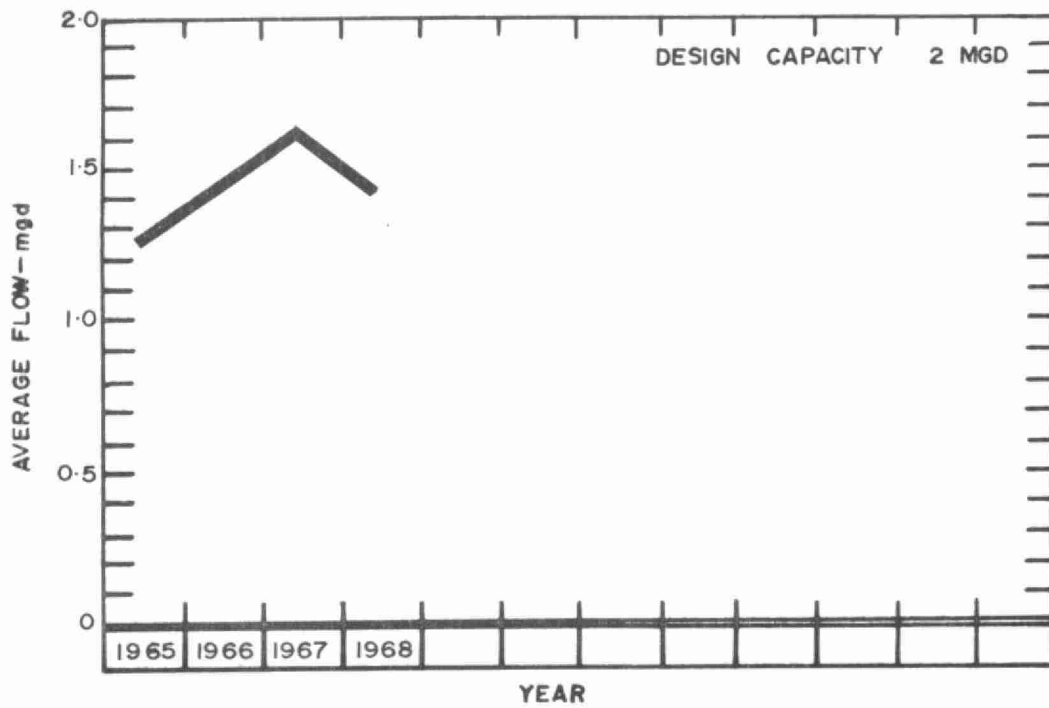
A total of 531.39 million gallons of raw sewage was treated for an average daily flow of 1.45 million gallons in 1968. This is a decrease of approximately 12 percent from the 1967 flow of 606.46 million gallons.

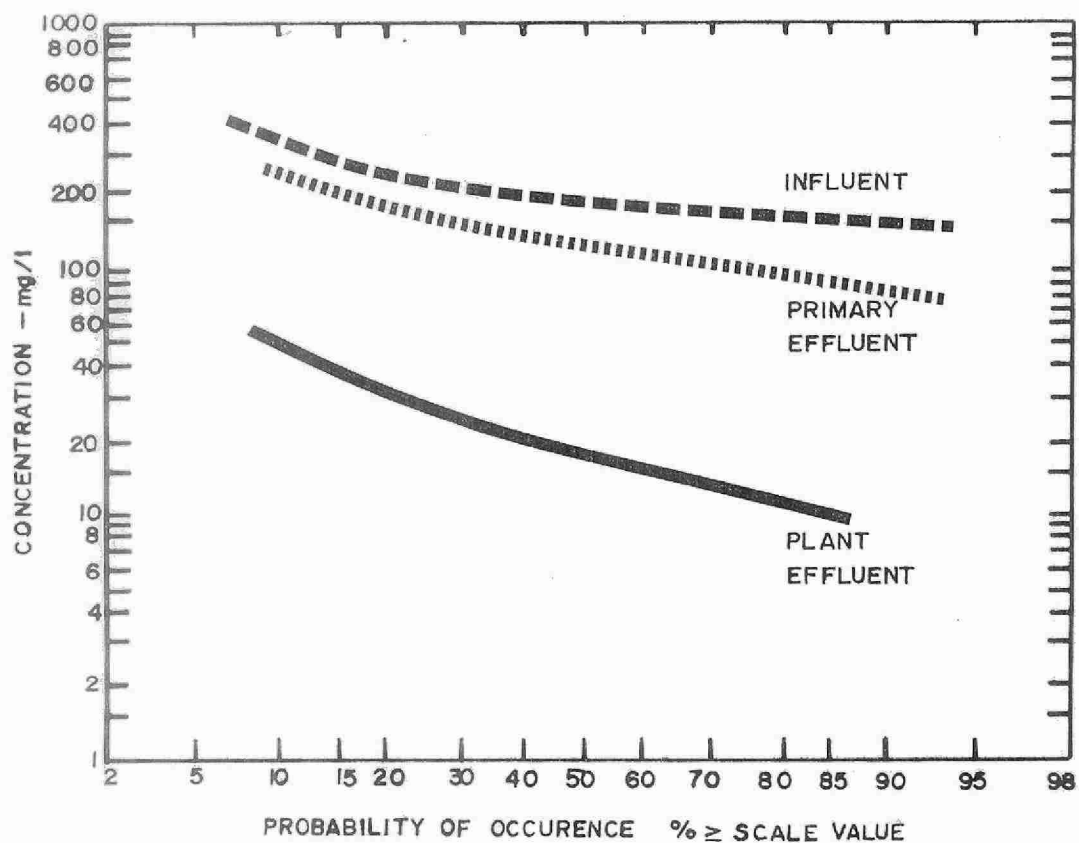
The daily flow exceeded the plant dry weather design capacity of 2.0 mgd approximately 12 percent of the time compared to 25 percent of the time in 1967.

Chlorine was used to disinfect the final effluent from May 15 to October 20. A total of 12,640 pounds of chlorine was used for an average dosage of 6.6 mg/l. The dosage was required to maintain a minimum residual of 0.5 mg/l after 15 minutes' contact time.

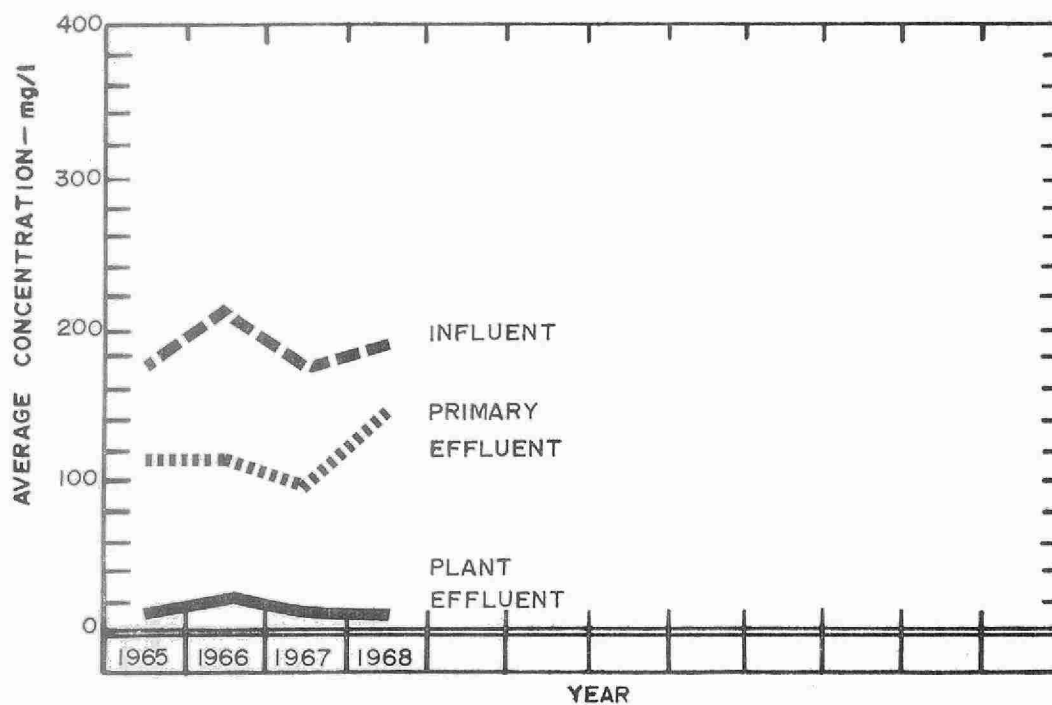


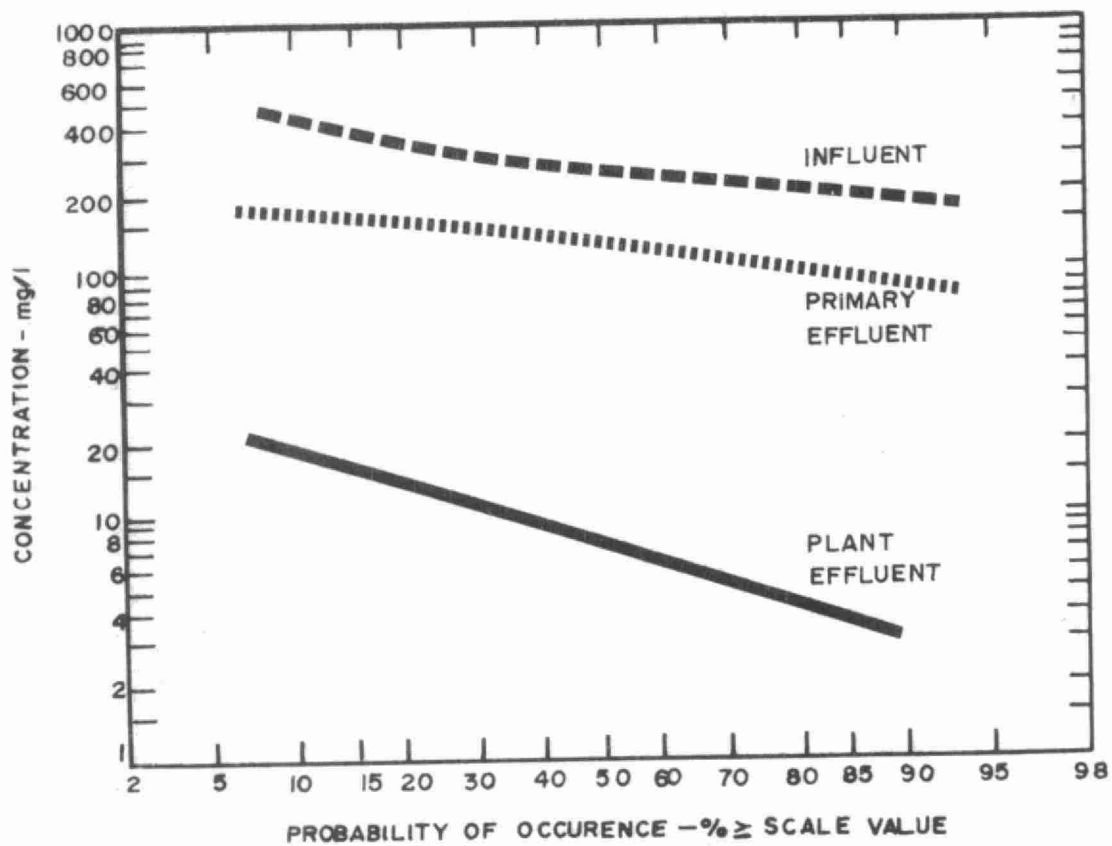
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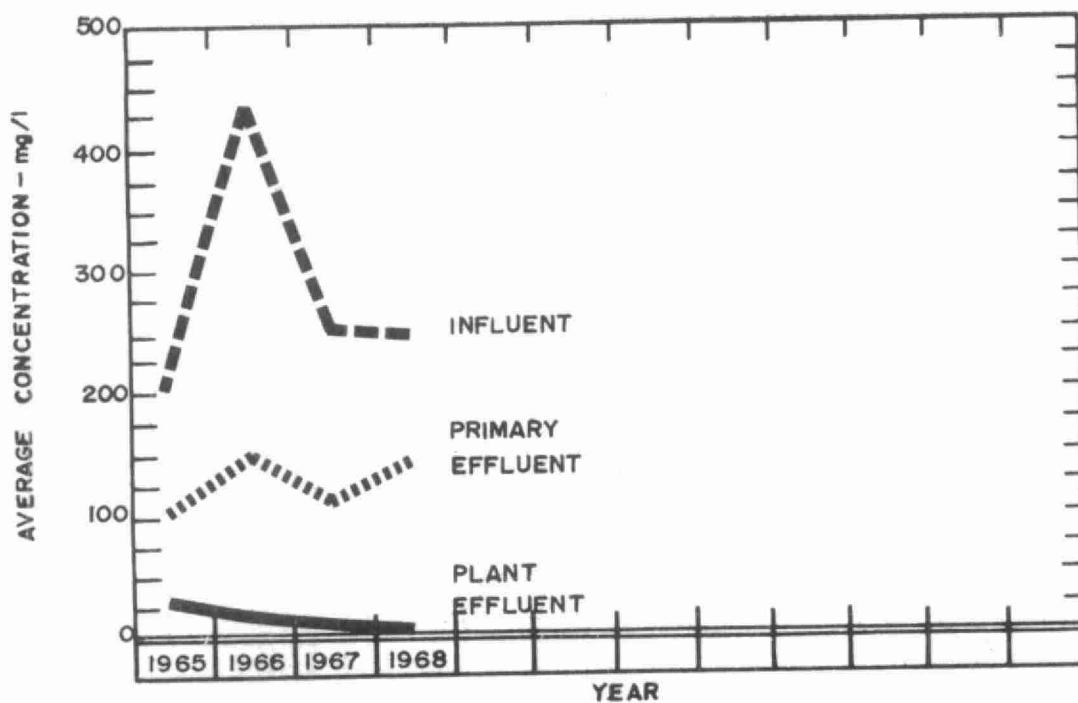


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ³ lb	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ³ lb	REMOVAL ft ³
JAN	160	24	85	56.5	406	5	99	166.6	66
FEB	205	14	93	99.7	238	2	99	170.1	62
MAR	140	6	96	81.7	203	4	95	121.8	78
APR	150	5	96	72.2	229	4	98	112.3	52
MAY	150	10	94	64.3	138	6	96	60.4	70
JUN	-	-	-	-	-	-	-	-	56
JULY	210	-	-	-	199	-	-	-	64
AUG	215	15	93	71.2	325	12	96	111.4	67
SEPT	380	48	87	120.9	240	12	95	93.0	62
OCT	210	33	84	65.9	258	18	93	89.4	64
NOV	190	11	94	87.9	266	13	95	124.2	60
DEC	120	12	90	57.2	190	2	99	99.5	75
TOTAL	-	-	-	-	-	-	-	-	776
AVERAGE	194	18	91	77.8	253	8	97	114.9	65

COMMENTS

The raw sewage had an average concentration of 194 mg/l BOD and 253 mg/l suspended solids. The final effluent had an average concentration of 18 mg/l BOD and 8 mg/l suspended solids. This represents a good BOD reduction of 91 percent and a very good suspended solids reduction of 97 percent.

A total of approximately 388.8 tons of BOD and 574.4 tons of suspended solids was removed during the year.

Final effluent concentrations of 18 mg/l BOD and 8 mg/l of suspended solids may be compared with OWRC objectives of 15 mg/l for each.

An estimated 776 cubic feet of grit were removed during 1968 for an average of 1.4 cubic feet of grit removed per million gallons of raw sewage treated.

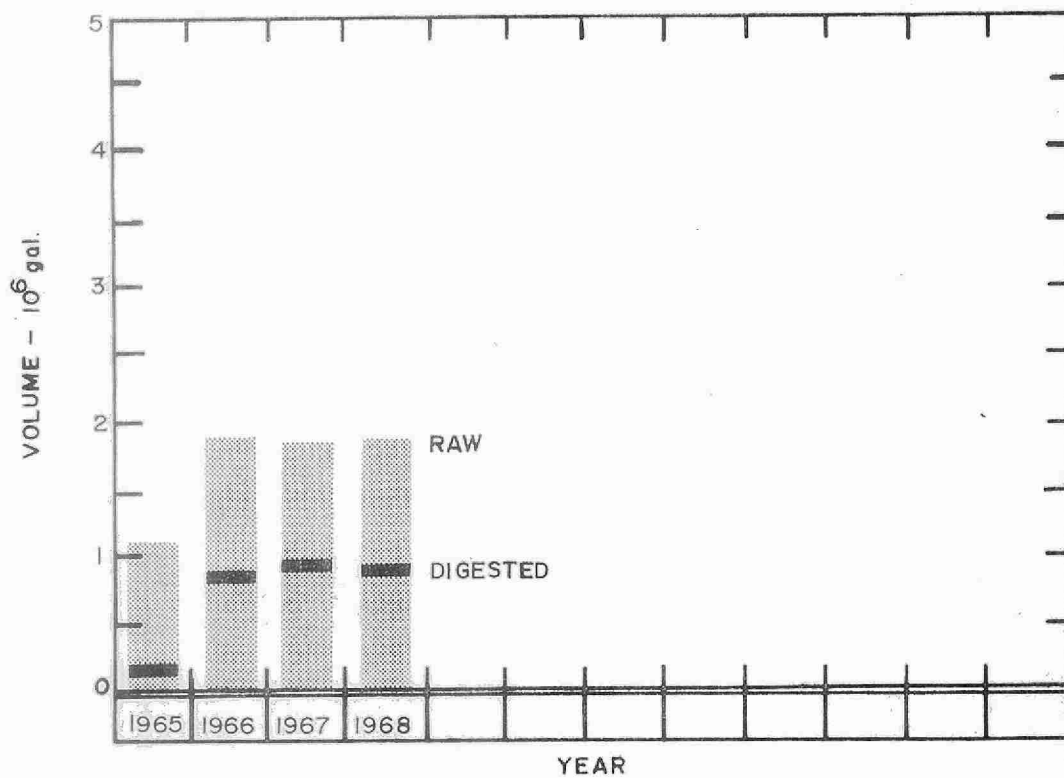
AERATION

MONTH	AVERAGE FLOW mgd	PRIMARY EFF		SECONDARY EFF		MLSS CONC ^N mg/l	F/M ($\frac{\text{lb BOD}}{\text{lb MLSS}}$)	AIR USED ($\frac{1000 \text{ ft}^3}{\text{lb BOD}}$) REMOVED	WASTE SLUDGE lb
		BOD CONC ^N mg/l	SS CONC ^N mg/l	BOD CONC ^N mg/l	SS CONC ^N mg/l				
JAN	1.34	56	75	24	5	1,570	.10	-	-
FEB	1.80	158	154	14	2	2,240	.26	-	-
MAR	1.94	122	91	6	4	2,270	.22	-	-
APRIL	1.66	106	154	5	4	1,880	.19	-	-
MAY	1.48	115	83	10	6	1,910	.24	-	-
JUN	1.20	-	-	-	-	-	-	-	-
JUL	1.08	100	102	-	-	2,140	-	-	-
AUG	1.15	92	109	15	12	-	-	-	-
SEPT	1.21	230	160	48	12	4,890	1.03	-	-
OCT	1.20	155	109	33	18	4,820	.70	-	-
NOV	1.64	110	135	11	13	1,900	.22	-	-
DEC	1.71	72	120	12	2	2,110	.08	-	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	1.45	120	117	18	8	2,570	.34	-	-

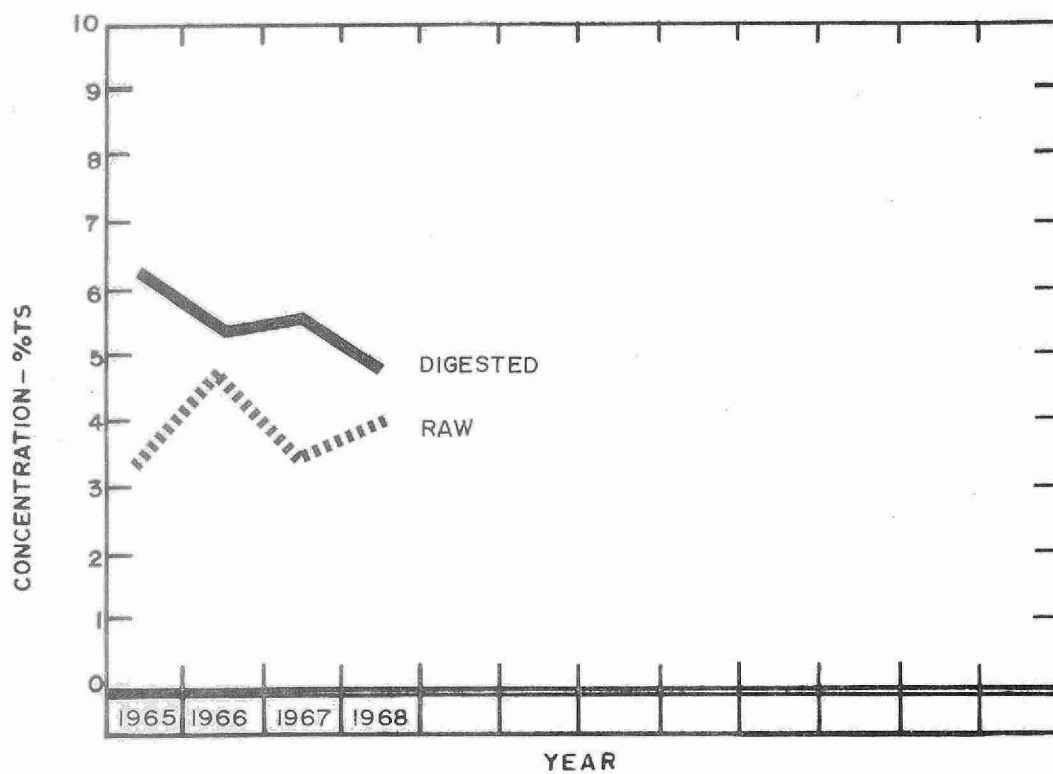
COMMENTS

The average concentration of the primary effluent directed to the aeration tanks was 120 mg/l BOD and 117 mg/l suspended solids. The average mixed liquor suspended solids concentration in the aeration tanks was 2,570 mg/l. The average F/M ratio was 0.34 or a loading of 34 pounds of BOD per 100 pounds of mixed liquor suspended solids.

It should be noted that the OWRC Research Division carried out process studies during the year particularly from June to November. Therefore, a variation occurred in the concentrations, loadings and aeration tank volumes used.



DIGESTION



SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME 10 ⁴ gal	T. S. %	V. S. %	VOLUME 10 ³ gal	T. S. %	LIQUID yd ³	DEWATERED yd ³
JAN	1.60	2.5	-	9.55	3.2	-	-	0.2	567	0
FEB	1.45	3.4	73	9.55	9.5	36	-	0.2	567	0
MAR	1.55	2.1	61	5.91	3.9	48	-	0.2	351	0
APR	1.50	4.1	67	7.58	1.3	53	-	0.2	450	0
MAY	1.55	4.4	60	7.73	4.4	49	-	-	459	0
JUN	1.92	-	-	7.88	-	-	-	-	468	0
JUL	1.61	3.5	58	8.59	4.3	50	-	-	510	0
AUG	1.61	2.9	53	8.42	10.6	79	-	0.2	500	0
SEPT	1.56	4.9	62	6.74	4.7	39	-	0.2	400	0
OCT	1.50	5.8	58	8.76	4.4	50	5.0	-	520	0
NOV	1.56	6.6	66	5.56	2.3	53	-	1.5	330	0
DEC	1.59	3.8	64	9.43	4.2	46	-	.2	560	0
TOTAL	19.00	-	-	95.70	-	-	-	-	5682	0
AVERAGE	1.58	4.0	62	7.98	4.8	50	-	.3	474	0

COMMENTS

A total of 1,900,000 gallons of raw sludge was pumped to the digesters and a total of 957,000 gallons of digested sludge was removed from the digesters by tank truck.

The laboratory results indicate that a volatile solids reduction of approximately 49 percent was realized, indicating a satisfactory digestion.

Date Due

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CONCLUSIONS

The plant was well maintained and operated, and provided satisfactory treatment.



Water management in Ontario